AMENDMENTS TO THE SPECIFICATION:

Page 1, before line 1, insert the following heading:

Page 1, before the paragraph beginning on line 2, insert the following headings:

BACKGROUND OF THE INVENTION

1. Field of the Invention

Page 1, before the paragraph beginning on line 5, insert the following heading:

2. Description of the Related Art

Please replace the paragraph beginning at page 1, line 2 with the following:

This invention relates to a viscosimeter for measuring the relative intrinsic or inherent viscosity of a solution in a solvent ~~according to the preamble of the claims 1, 3, and 4~~.

Please replace the paragraph beginning at page 1, line 5 with the following:

According to the state of the art, the difference is made between the relative, the specific as well as the inherent viscosity and finally the limiting viscosity number (intrinsic viscosity). By relative viscosity, we understand the quotient of the viscosity of the solution, for example of a polymer, to the viscosity of the pure solvent. The inherent viscosity results as the quotient of the natural logarithm of the relative viscosity divided by the concentration in ~~gramm~~ grams of the dissolved substance per millimeter solution. There results herefrom the intrinsic viscosity as a limiting value of the inherent viscosity for the case that the aforesaid concentration goes toward zero. The so-called Hagen-Poiseuille's formula is fundamental for viscosity measures. According to the state of the art, individual ~~capillar~~ capillary measures are known for which the volume rate of the solution flow and the flow pressure drop are measured and, the geometric dimensions of the ~~capillars beeing~~ capillary being known, the viscosities of the examined liquids can be determined herefrom. The disadvantage of this measuring method consists in

the unfavourable signal-to-noise ratio. The noise is essentially produced by high-frequency interfering signals of the pump which is required for conveying the substance to be examined. Moreover, irregular flow rates of the substance including the counterpressure fluctuations produce interfering signals on flow resistances. Finally, it is known that the viscosity is of course temperature-dependent, for which reason variations of temperatures during the measure can distort the measuring result.

Page 4, before the paragraph beginning on line 12, insert the following heading:

SUMMARY OF THE INVENTION

Please delete the paragraph beginning on page 4, line 18.

Please replace the paragraph beginning at page 4, line 20 with the following:

According to one embodiment ~~claim 1,~~ of the invention, ~~consists in that~~ a flow resistance with the smallest possible volume is used in the sample flow leg (hereunder designated as KV flow resistance), this flow resistance being placed directly

behind the feeding point of the flow division. Accordingly, the viscosimeter shows flow resistances, such as disk-shaped or leaf-shaped Venturi nozzles or different KV flow resistances, with the smallest possible thickness and with a small volume with respect to all other parallel and following capillaries in a flow conduit system with two legs. This flow conduit system contains in the first leg at least three pressure reducing elements, for example capillaries, whereby behind the capillary following the branch point a pressure manometer is provided for with a connected bigger vessel, whereby behind further capillaries connected with each other with different diameters and with a big volume which corresponds to 100 to 1000 times the KV flow resistance in the second leg, a branch point leads to a differential pressure sensor or a sensor for differential pressure followed by capillaries with different diameters connected with each other up to the junction in a common outlet conduit. In the second leg, the KV flow resistance follows the branch point, this resistance being followed by further big volume conduits which lead to the branch point of the opposing side of the differential pressure sensor or of the sensor for differential pressure, whereby further capillaries connected with each other with different diameters and with different lengths follow the branch point, these capillaries joining into the common outlet conduit.

Please replace the paragraph beginning at page 6, line 20 with the following:

The viscosimeter according to ~~claim 3~~ another embodiment also shows flow resistances, such ~~wuch~~ as disk-shaped or leaf-shaped Venturi nozzles or different KV flow resistances, with the smallest possible thickness and with a small volume with respect to all other parallel and following capillaries in a flow conduit system with two legs. Unlike the viscosimeter according to ~~claim 1~~ the first embodiment, the flow conduit system shows three parallel flow circuits among which at least two flow circuits are connected by a differential pressure sensor or sensor for differential pressure. These three flow circuits constitute an analogy to the Thompson bridge. The arrangement itself consists of an inlet which runs into a branch and divides into two legs, whereby one of the two legs comprises a pressure reducing element, a following branch point to a differential pressure sensor or to a sensor for differential pressure and a reducing element in the feeding conduit to a junction which runs into an outlet conduit. The other leg starting from the branch point comprises a pressure reducing element which leads to a branch which first leads into a big volume vessel leading to a junction

and second which leads to a resistance capillary which is connected in the junction with the differential pressure sensor or the sensor for differential pressure and which is furthermore connected with a resistance capillary in the conduit lead from the junction to a further junction, whereby the resistance capillary is connected on the outlet side over the junction with a pressure reducing element which runs over a conduit section into the junction and thus into the outlet conduit.

Please replace the paragraph beginning at page 7, line 15 with the following:

The invention according to ~~claim 4~~ another embodiment consists in that the viscosimeter shows flow resistances, such as disk-shaped or leaf-shaped Venturi nozzles or different KV flow resistances, with the smallest possible thickness and a small volume compared to all other parallel and following capillaries, whereby these flow resistances are placed directly behind the feeding points of the flow division and in the other partial leg behind the flow division there follows a long conduit with a big internal diameter which is furthermore more precisely defined by the fact that the capacity of this long tube amounts to 100 to 1000 times the KV flow resistance.

Please replace the paragraph beginning at page 8, line 3 with the following:

Furthermore, a KV flow resistance can also be created in that the flow resistance can be used, for example, in the form of disk-shaped or leaf-shaped Venturi nozzle bodies with the smallest possible thickness. Here, the low spatial or volumetric dimension is decisive, which is advantageous in that, because of the favorable ~~favourable~~ ratio of volume, the sample can be decomposed into nearly infinitesimal signal sizes in time and thus a systematic enlarging of the measuring signals through the measuring system, as it is observed for all measuring cells used according to the state of the art, is avoided. This enlarging had to be corrected, for example mathematically, up to now as far as this was possible. Further configurations of the viscosimeter are also possible ~~described in the claims 2 to 9~~. For example, in the case of the Venturi nozzle body, the thickness should be smaller or bigger than 2 mm, preferably 2 mm or 3 mm. Preferably, the Venturi nozzle body flow opening is circular or slit-shaped. Alternatively, the nozzle body can however also have several hole-type openings of 1µ to 10µ. The channels of the microsystem technique components can have structures with a width of 10µ to 100µ. The same is valid for so-called fused silica capillaries

and capillaries with which corresponding ratios of volume can be realized because of their internal diameter.

Please replace the paragraph beginning at page 9, line 19 with the following:

For checking or for the further detection, it can be advantageous to place a refraction detector or a membrane osmosis detector in the supply network. Further detectors are conceivable in specific combinations and represented in ~~fig.~~ Figs. 12 to 14.

Page 10, before the paragraph beginning on line 1, insert the following:

BRIEF DESCRIPTION OF THE DRAWINGS

Please replace the paragraph beginning at page 10, line 1 with the following:

~~Fig.~~ FIG. 1 shows the flow profile of a sample in a capillary.

Please replace the paragraph beginning at page 10, line 2 with the

following:

~~Fig.~~ FIG. 1A shows the flow profile of a sample with a high flow rate or a high molecular weight.

Please replace the paragraph beginning at page 10, line 4 with the following:

~~Fig.~~ FIG. 2 shows the signal course of a sample which flows through the cell with a rectangular flow profile.

Please replace the paragraph beginning at page 10, line 6 with the following:

~~Fig.~~ FIG. 3 shows a curve course according to ~~fig.~~ FIG. 2 by considering the real flow profile of a sample as well as in dotted lines by considering the flow profile represented in ~~fig.~~ FIG. 1A.

Please replace the paragraph beginning at page 10, line 9 with the following:

~~Fig.~~ FIG. 4 shows a representation of two measuring signals of different detectors with a different layer thickness.

Please replace the paragraph beginning at page 10, line 11 with the following:

~~Fig.~~ FIG. 5 shows the signal course by using a KV flow resistance according to the invention.

Please replace the paragraph beginning at page 10, line 13 with the following:

~~Fig.~~ FIGS. 6 to 14 show respectively schematic arrangements of viscosimeters according to the invention.

Please replace the paragraph beginning at page 10, line 15 with the following:

~~Fig.~~ FIG. 15 is an annex with formulae.

Please replace the paragraph beginning at page 10, line 16 with the following:

~~Fig.~~ FIG. 16 shows the arrangement in form of a flow chart of

a further embodiment of the viscosimeter according to the invention.

Please replace the paragraph beginning at page 10, line 19 with the following:

~~Fig.~~ FIG. 17 shows the arrangement in form of a flow chart with three parallel flow circuits of a further embodiment of the viscosimeter according to the invention.

Page 10, before the paragraph beginning on line 22, insert the following:

DETAILED DESCRIPTION OF THE INVENTION

Please replace the paragraph beginning at page 10, line 22 with the following:

When a capillary 10 is flown through by a liquid in direction of a part 11 represented in FIG. ~~fig.~~ 1, it shows the parabolic flow profile known according to the state of the art. As may be seen in FIG. ~~fig.~~ 1, this is also valid for the case that a sample 13 is given into an eluent 12, for example, in form of a drop.

Please replace the paragraph beginning at page 11, line 4 with the following:

For a finite layer thickness of a cell 10 and an ideal sample with a rectangular flow profile, there results the signal course represented in FIG. ~~fig.~~ 2 for which at the time tithe sample enters the cell, whereby there is a mixture between the sample and the eluent in the cell up to the time t2. From the time t2, the sample fills the cell completely, namely until the time t3 from which the eluent 12 is charged later. At the time t4, the sample 13 has completely left the cell, there is only the eluent therein.

Please replace the paragraph beginning at page 11, line 12 with the following:

If we consider the real flow profile according to FIG. ~~fig.~~ 1, there results the signal course which can be seen in FIG. ~~fig.~~ 3 in which during the period between t1 and t2 the sample 13 with its parabolic front flows into the cell. The same is valid by leaving the sample 13 with respect to the period between the times t5 and t6 in which the curve course is not linear. Due to this curve course which is not linear, the analysis is however

considerably complicated. A further complication appears when, in case of high flow rates and samples with a high molecular weight with a corresponding concentration, a flow profile according to FIG. ~~fig.~~ 1A is constituted. For these cases, there results the signal course represented in dotted lines in FIG. ~~fig.~~ 3 which only allows relative relations.

Please replace the paragraph beginning at page 11, line 25 with the following:

The signal is completely insoluble when two detectors emit output signals A and B which have, for example, the idealized time history represented in FIG. ~~fig.~~ 4. It comes regularly to a so-called offset C of the detectors because of the distance differences for the sample stopper 13. Moreover, there results, because of different layer thicknesses of the cells 10, a different edge steepness of both signals A and B.

Please replace the paragraph beginning at page 12, line 11 with the following:

t7: the second cell is also filled with eluent. The parabolic form of the flow profile is not yet taken into account, what

leads to a further complication for a signal course, as represented in FIG. ~~fig.~~ 3.

Please replace the paragraph beginning at page 12, line 15 with the following:

Apart from the different signal courses, there remains, in the analytic practice ~~practise~~, further the problem that in many cases no plateaus are constituted what results in that intrinsic properties and systematic errors cannot be distinguished any longer.

Please replace the paragraph beginning at page 12, line 19 with the following:

This invention remedies, as FIG. ~~fig.~~ 5 shows with the curve for a viscosimeter with a small thickness of the KV flow resistance. The times tI and t2 represent the inlet of the sample 13 into the KV flow resistance or the outlet of the sample thereof. Before and after these times t1 and t2, the eluent is respectively in the KV flow resistance. As may be seen in FIG. ~~fig.~~ 5, we obtain not only quasi signal rectangular courses, i.e. the omission of the leading edges ~~eges~~ and of the trailing edges,

but in the case of the use of two detectors, also definite resolution possibilities. This also results from the following theoretical considerations:

Please replace the paragraph beginning at page 14, line 13 with the following:

The arrangement of the KV flow resistances in different assemblies can be seen in FIG. ~~fig.~~ 6 to 14.

Please replace the paragraph beginning at page 14, line 15 with the following:

The arrangement according to FIG. ~~fig.~~ 6 possesses an inlet opening 14 into which the eluent 12 is introduced, eventually after filtration. The lead-through conduit possesses two KV flow resistances placed in series 15 and 16 over which the pressure drop can be respectively measured with pressure sensors 17 and 18. Both values measured by the pressure sensors 17 and 18 are supplied to a differential amplifier 19, are amplified there and treated in the usual manner.

Please replace the paragraph beginning at page 15, line 3 with

the following:

The arrangement represented in FIG. ~~fig.~~ 7 possesses, in contrast to the arrangement described above, a retention basin 23 instead of the loop of the valve 21. Compared with the arrangement described above, the solvent is examined with the sample in the first KV flow resistance 15 which serves here as analytical appliance, If the sample comes into the retention basin 23, it is there considerably diluted and moreover retarded in time in such a way that the KV flow resistance 16 measures only or at least substantially only the solvent. The resistances of this arrangement must not be balanced since their variations do not influence the result.

Please replace the paragraph beginning at page 15, line 14 with the following:

FIG. ~~Fig.~~ 8 shows the principally ~~principially~~ known bridge arrangement for which the supplying conduit 24 is separated into two partial conduits 25 and 26 which have KV flow resistances 27 and 28 or 29 and 30 respectively placed in series. The conduits 25 and 26 join behind the KV flow resistances 28 and 30 to an outlet conduit 31. A bridge conduit 32 with a highly sensitive

pressure detector 33 is between the KV flow resistance 27 and 28 on the one hand and the KV flow resistance 29 and 30 on the other hand. Additionally, there is ~~are~~ still a retention basin 34 of the above described type in the conduit 26 and a compensating vessel 35 in the conduit 25 before the KV flow resistance 28 ~~30~~ for the temperature conditioned expansion of the liquid, this being seen in flow direction, as well as a tank 36 from which the sample solution can be given into the eluate. A safety valve 37 is switched in parallel for the protection of the highly sensitive pressure measuring device 33.

Please replace the paragraph beginning at page 16, line 23 with the following:

FIG. ~~Fig.~~ 9 shows in the inlet conduit an admission pressure sensor 44 which measures the pressure drop over the whole capillary arrangement. In the branch conduit 25, from the branch point with a vessel with a big internal diameter, a dilution vessel 35 and downstream an aforesaid capillary 27 is connected. The second conduit part 26 is comparatively short up to the KV flow resistance 29 in order to run into a dilution vessel 34 downstream of the KV flow resistance ~~behind~~ 29. The volumes of the vessel and of the supplying capillaries are big in comparison

with the volume of the downstream flow resistance 29. The part of the arrangement lying behind the part near the pressure sensor 33 again corresponds to the arrangement of FIG. ~~figure~~ 8. The working principle of FIG. ~~fig.~~ 9 differs from that of FIG. ~~fig.~~ 8 in that the signal detection takes place completely differently in the front part of the arrangement. As soon as the sample stopper enters the partial leg 26 and reaches the KV flow resistance 30, a signal value is determined, since the sample part which is simultaneously eluted in the partial leg 26 has to flow through the ~~wide~~ big volume vessels and the dilution vessel 34. Here, the already described dilution and retardation take place so that the rise of pressure recorded in the partial leg 26 is not compensated (as this is the case for the arrangement described in FIG. ~~fig.~~ 8) but can be measured. The components following behind the diagonal leg (in 33) only serve by appropriately selecting the resistances to fix the distribution ratio of the flow between partial legs 25 and 26. Due to this arrangement, more than 50% of the sample can be used for the further increase of sensitivity.

Please replace the paragraph beginning at page 17, line 18 with the following:

According to FIG. ~~fig.~~ 10 which is substantially constituted like the arrangement according to fig. 8, a gel permeation chromatograph column 38 is inserted between the first and the second flow resistances ~~resistance~~ 29 and 30 in the leg 26, column from which the polymer stopper emerges and directly enters the taper of the nozzle 30. The pressure drop takes place after the shortest distance, whereby the sample is not enlarged. Preferably, the whole arrangement is in a sealed space 39 which guarantees the constancy of temperature. For the differential measurement carried out, a compensation of the temperature flow fluctuation can eventually be performed, if necessary.

Please replace the paragraph beginning at page 17, line 30 with the following:

As indicated in FIG. ~~fig.~~ 11, the arrangement 40 represented for example according to one of FIGS. ~~fig.~~ 6 to 14 can also be connected to a refraction detector 41 or basically to further detectors which can give further information about the physical or chemical constitution of the sample. Here, the RI detector 41 can also be divided and inserted into the two partial legs, as represented in FIG. ~~fig.~~ 13. The same is valid for further detectors such as membrane osmometers, laser scattered light

detectors and others (FIG. 12). ~~Both possible types of placing are represented in fig. 12 and 14.~~

Please replace the paragraph beginning at page 18, line 9 with the following:

Furthermore, it is possible to have a block-type arrangement of the detectors, for example, in an arrangement in a row, whereby the first detector is the viscosimeter. By omitting a partial flow, a single-capillary viscosimeter is obtained, whereby a vessel or a container with a comparatively big volume is placed before the measuring capillaries. The pressure measurement is then performed between the big volume vessel and the measuring capillaries. A sufficient quantity of the sample solution is then available in the big volume vessel in order to displace the solvent so that the sample is then conveyed to the first measuring cycle. In this way, high-purity measurements are carried out since the measure is based only exclusively on the sample solution.

Please replace the paragraph beginning at page 18, line 22 with the following:

According to a further embodiment of the invention according to FIG. ~~fig.~~ 16, an arrangement for a viscosimeter with a flow conduit system with two legs L1, L2 is provided for. The first leg L1 comprises at least three pressure reducing elements, whereby downstream of a ~~behind the~~ capillary 103 following a branch point 102 a pressure manometer 104 with a consecutive bigger vessel 105 is provided ~~provioed~~ for. In the conduit after the branch point 102, further capillaries 106, 108 with different diameters and with big volumes, which are connected by a junction 107, are provided for which correspond to 100 to 1000 times a KV flow resistance 121 ~~221~~ in the second leg L2. In the conduit of the leg L1 leading from the branch point 102, a further branch point 109 follows the capillaries 106, 108, this branch point leading to a differential pressure sensor or to a sensor for differential pressure 122. A conduit section with two capillaries 110, 112 with different diameters which are connected with each other by a junction 111 follows this branch point 109. The conduit section of the leg L1 which shows the capillaries 110,112 runs into a junction 113 and from there into an outlet conduit 114. In the other leg L2, the KV flow resistance 121 ~~221~~, which is followed by further big volume conduits, follows the branch point 102. The conduit section which receives the big volume conduits and the KV flow resistance 121 ~~221~~ leads to a branch

point 118 which is connected by a conduit section with the branch point 109, whereby the differential pressure sensor or the sensor for differential pressure 122 is placed. From the branch point 118 in the leg L2, there follows a conduit section which leads to the junction 113 and thus into the outlet conduit 114. Capillaries 115, 117 with different diameters and with different lengths, which are connected with each other by a junction ~~conduit~~ 116, are placed in this conduit section. In this arrangement for the viscosimeter, the liquid supply takes place over the inlet 101 and from the branch point ~~junction~~ 102 into the leg L1 or into the leg L2. From this branch point ~~junction~~ 102, a conduit section in the leg L1 leads to the branch point 109. In this conduit section, the capillary 103 is led over a big distance with a comparatively big volume to a manometer (absolute pressure manometer) 104 and from there to a still bigger vessel 105 which is then followed by the conduit section with the two capillaries 106, 108. The two capillaries 110, 112 with different diameters which are connected with each other by a conduit 111 are placed in the conduit section following the branch point 109. From the vessel 105 in the leg L1, a connection conduit leads to a pressure reducing element 106 which is a capillary, a nozzle, a frit or an appropriate device which reduces the pressure in the flow conduit, whereby all other pressure reducing elements which

are used can be configured in the same way. This pressure reducing element 106 is connected by the junction ~~conduit~~ 107 with a further capillary 108 with a big volume which runs into the branch point 109, whereby the differential manometer or the manometer for differential pressure 122 placed in the connecting conduit between the two branch points 109, 118 in the two legs L1, L2 is highly sensitive and shows the slightest pressure differences between the two branch points 109, 118 of the flow conduit. The big volume capillary 110 which is placed in the conduit section following the branch point 109 is connected by the junction ~~conduit~~ 111 with a pressure reducing capillary 112, whereby the pressure reduction must not be identical with that in the upper section of the flow conduit.

Please replace the paragraph beginning at page 20, line 17 with the following:

The conduit branch L2 derives from the branch point ~~junction~~ 102. The pressure reducing element 121 which can be configured in different ways is placed in this leg L2. The big volume vessel 120 directly follows this pressure reducing element 121, vessel from which a conduit 119 with a big internal diameter then leads to the branch point 118. From this branch point 118 ~~branch118~~, it

then leads over the conduit section with the inserted differential manometer or manometer for differential pressure 122 to the branch point ~~junction~~ 109. In the area of the conduit branch L2, a conduit section leads from the branch point ~~junction~~ 118 to the outlet conduit 114 and a conduit 117 with a big internal diameter is then provided for in this conduit section. The conduit then leads over the junction 116 to the pressure reducing capillary 115. The differential pressure manometer or manometer for differential pressure 122 is connected in such a way that it generates a positive signal for a pressure drop at the branch point 118. This is also the way how the viscosity signal is generated.

Please replace the paragraph beginning at page 21, line 3 with the following:

The viscosimeter according to FIG. ~~fig.~~ 17 shows a flow chart different from that of the viscosimeter according to FIG. ~~fig.~~ 16 in so far as three parallel flow circuits are provided for which constitute an analogy with the so-called Thomson bridge. This arrangement stands out in particular in case of low flow rates for which the resistances of supply conduits, even if slight, influence the accuracy of measurement. As shown in FIG.

~~fig.~~ 17, a flow conduit system with two legs L1, L2 is provided for the viscosimeter. This flow conduit system comprises three parallel flow circuits, at least two of them are connected by a differential pressure sensor or a sensor for differential pressure 216. The arrangement itself consists of an inlet 201 which runs into a junction 202 and divides into two legs L1, L2. The leg L1 comprises a conduit section with a pressure reducing element 203, a following branch point 204 and a further pressure reducing element 205. This conduit section runs into a junction 206 with a following outlet conduit 207. The other leg L2 which starts from the branch point 202 comprises a pressure reducing element 212 which is followed by a junction 211. In connection with this junction 211 there follows a big volume vessel 210, whereby a further junction 209 and a pressure reducing element 208 are placed in the following conduit section. This conduit section also leads to the outlet conduit 207. Both junctions 211, 209 are connected over conduit sections with a junction 215 which is again connected with the branch point 204 over a conduit section. The differential pressure sensor or the sensor for differential pressure 216 is placed in this conduit section. A resistance capillary 213, 214 is respectively placed in each of the two conduit sections between the junctions 211 and 209 and the junction 215. A flow conduit system with three parallel flow

circuits is obtained on the base of this arrangement.